

HAPPY 810 ENHANCEMENT  
INSTALLATION INSTRUCTIONS

HE810S-H ~~(X)~~ # B3285

HE810S-L < >

HE810S-X < >

FOR ATARI 810 DISK DRIVES  
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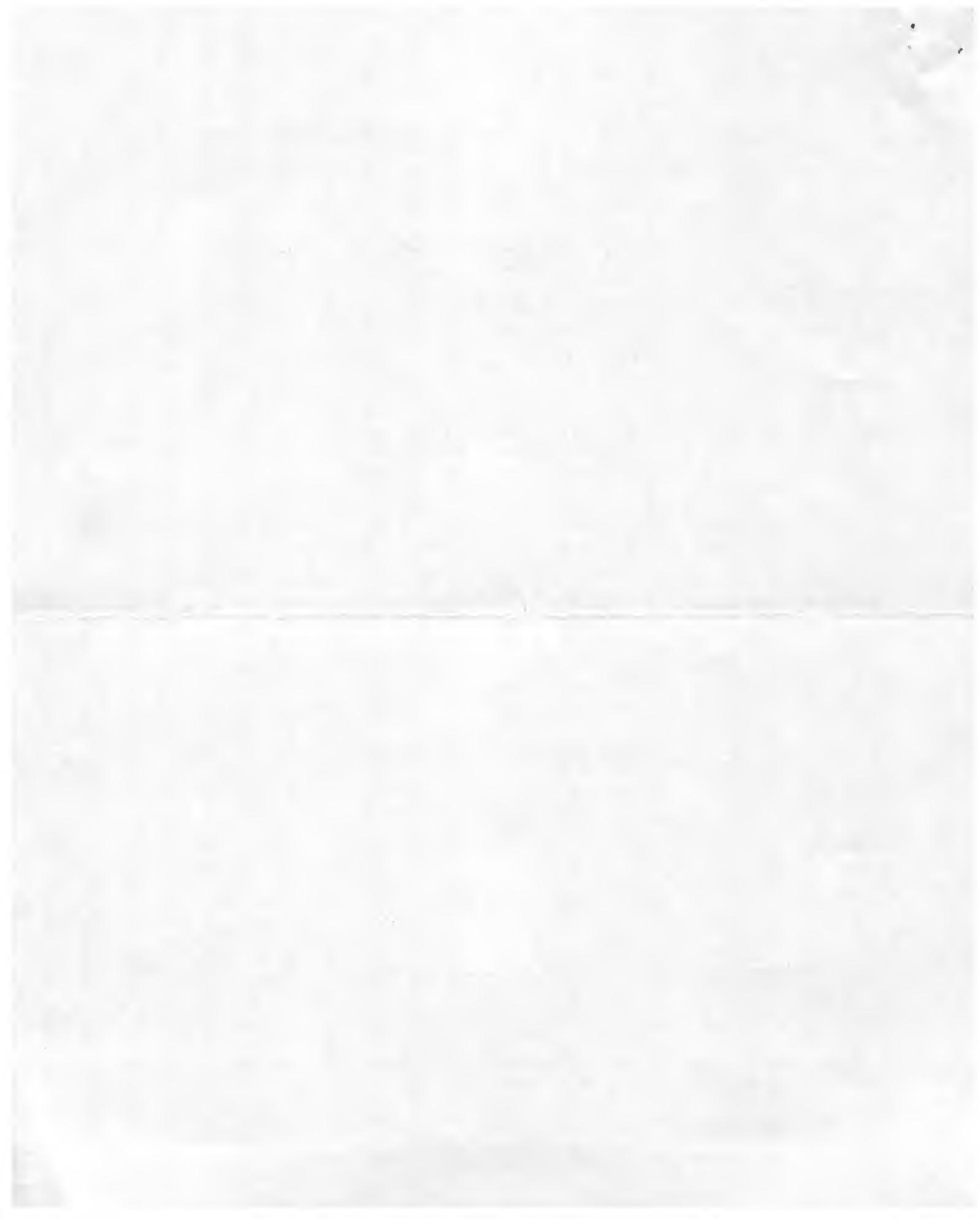
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**WARNING**

This 810 ENHANCEMENT should only be installed by a person familiar in working with hand tools, integrated circuits, and electronic machine disassembly and assembly. Installation should not be attempted by a beginner.

Installation of this ENHANCEMENT in your 810 DISK DRIVE MAY VOID YOUR WARRANTY!

Read the instructions completely before performing the work. If you do not feel comfortable in doing the installation yourself, then have a competent electronic technician do it for you.



**L I M I T E D   W A R R A N T Y**  
**H A P P Y   8 1 0   E N H A N C E M E N T   G U A R A N T E E**

HAPPY COMPUTING guarantees the HAPPY 810 ENHANCEMENT in the following ways with the listed conditions and exclusions.

- 1) The performance of the disk drive with the HAPPY 810 ENHANCEMENT will change as per the information contained in HAPPY COMPUTING's 810 ENHANCEMENT information package.
- 2) The HAPPY 810 ENHANCEMENT board assembly is guaranteed to be free from defects in materials and workmanship for a period of one year from the date of purchase. During this one year period HAPPY COMPUTING will repair the malfunctioning ENHANCEMENT board and provide standard carrier return shipment at no charge. HAPPY COMPUTING will not reimburse you for the shipping charges needed to send the board to HAPPY COMPUTING, nor will HAPPY COMPUTING reimburse you for the labor required to remove or reinstall the board into your disk drive.
- 3) After the first year, HAPPY COMPUTING will repair the board charging for the parts, labor, and return shipment as required. All repairs carry a one year guarantee on the parts and labor used to replace the defective components.

**C O N D I T I O N S   A N D   E X C L U S I O N S**  
**O F   T H I S   O N E   Y E A R   G U A R A N T E E**

- 1) The initial one year warranty stated in item 2 above shall become null and void if any of the below stated conditions letters A thru E become or are true:
  - A) If the 810 ENHANCEMENT board is tampered with, OR
  - B) If the disk drive is subject to abuse beyond normal wear, OR
  - C) If any circuit in the disk drive not on the ENHANCEMENT board becomes defective and electrically or mechanically destroys the ENHANCEMENT board, OR
  - D) If there has been obvious negligence during installation or removal of the ENHANCEMENT board on the part of the person doing this work, with respect to the instructions provided, OR
  - E) If the warranty card is not filled out and returned to HAPPY COMPUTING.
- 2) HAPPY COMPUTING's warranty covers the ENHANCEMENT board only, damage to any other circuit or mechanism caused by the ENHANCEMENT or otherwise is not HAPPY COMPUTING's responsibility.
- 3) HAPPY COMPUTING will provide service only for the HAPPY 810 ENHANCEMENT.
- 4) HAPPY COMPUTING assumes no liability for loss of business or income due to malfunction of the HAPPY 810 ENHANCEMENT, nor any other liability for consequential damages.
- 5) This entire guarantee is not transferable and applies only to the original purchaser.

## OUTLINE OF INSTALLATION

- 1) DISK PREPARATION
- 2) SET UP THE WORK AREA AND TOOLS
- 3) TOP COVER REMOVAL
- 4) BOTTOM COVER REMOVAL
- 5) SIDE BOARD REMOVAL
- 6) RF SHIELD REMOVAL
- 7) INTEGRATED CIRCUIT REMOVAL
- 8) ENHANCEMENT BOARD INSTALLATION
- 9) INTEGRATED CIRCUIT PLUG IN
- 10) INITIAL TRY OUT
- 11) RF SHIELD INSTALLATION
- 12) SIDE BOARD INSTALLATION
- 13) SECOND TRY OUT
- 14) BOTTOM COVER INSTALLATION
- 15) TOP COVER INSTALLATION
- 16) FINAL TRY OUT
- 17) NOTES ON ENHANCEMENT REMOVAL
- 18) TROUBLE SHOOTING

## DISK PREPARATION

Prepare at least 3 scratch disks so that you don't have to ruin any good disks during the try out phase.

Initialize the 3 disks with the DOS INITIALIZE command. Then write DOS files on each of these disks. Verify that each disk boots correctly, and place a write protect tab on each disk. Set these disks aside and prepare your work area and tools.

Once the scratch disks are prepared, you may disconnect all cables from your 810, and move it to your work area described below.

## WORK AREA AND TOOLS

### WORK AREA

Your work area should have enough space to hold all parts and tools without cramping your style. There should be adequate lighting. A large clean desk top is ideal. Place a protective cover over the work area so as not to scratch the surface during the job.

### STATIC ELECTRICITY

Wear clothes and shoes (or no shoes) such that NO static electricity is present in your work area. Cotton is good for this purpose. Preferably, the work area should be situated on a bare floor rather than a carpet. Static electricity can damage your disk drive and your ENHANCEMENT board's components.

### TOOLS NEEDED

- 1) Medium size phillips screwdriver with a sharp tip, a magnetic shaft, and a shaft at least 4 inches long.
- 2) A container to hold the screws and parts removed during disassembly. An aluminum pie pan is good for this (no pie of course).
- 3) A needle nose pliers to straighten pins on the integrated circuits and the pins on the enhancement board, and to bend the metal tabs on the RF shield.
- 4) An XACTO knife or similar tool to lift the plastic tabs off the top cover.
- 5) A tool to lift integrated circuits out of their sockets without bending the pins too much, such as an IC removal tool for 24, 28 and 40 pin devices, or a firm metal nail file, or a small screwdriver with a thin wide flat blade.
- 6) Only if you are installing the HE810S-X will you need soldering equipment. Use a fine tip pencil soldering iron of less than 40 watts, and rosin core solder. Do not use a soldering gun or acid core solder.

## TOP COVER REMOVAL

### PLASTIC HOLE COVERS REMOVAL

Using the XACTO knife blade or a similar firm sharp flat instrument, insert the blade under the corner of each plastic tab cover. These covers are located on top of the disk drive in each of the four round small indentations. Pry upward gently and carefully so as not to cut the plastic. Lift each cover off and place them sticky side down on the slotted area at the rear of the top cover. This will make them easy to lift off and replace later.

### UNSCREW AND REMOVE THE TOP COVER

Using the phillips screwdriver, unscrew each of the four screws and leave them in the holes in the top cover. At this point, if your screwdriver does not fit correctly, find one that does so as not to ruin the screw heads.

Lift the top cover off and place it out of the way, where it will not be damaged.

## BOTTOM COVER REMOVAL

The entire internal mechanism is attached to the bottom cover with five screws. With the front of the disk drive facing you there are 3 screws located on the right, and two on the left. All five screws go through the bottom metal plate, into the bottom plastic cover.

At this point, do not remove any screws which attach the circuit boards.

The 3 screws on the right are easily visible and are located one at the front, one at the middle, and one at the rear, all at the same altitude, and in line with each other. Remove these and place them in the container. There will probably be a lockwasher under the middle screw.

The 2 screws on the left should now be removed. There is one at the rear lying inside a right angle bend in the metal at the rear. The one at the front is more difficult to find. It is located between the vertical side board and the disk mechanism, and is also between the metal cover on this circuit board and the plastic front cover panel of the disk drive.

Now lift the front of the internal mechanism slightly and remove the plastic front panel; put it aside. The entire mechanism assembly may now be removed from the bottom cover by lifting it out. Lift up at the front, a slight pressure at the rear of the bottom plastic cover will allow the I/O connector to clear the cover.

Set the bottom cover aside, and place the internal assembly in front of you. You are now ready to remove the side board.

## SIDE BOARD REMOVAL

The side board is the 11 inch long board on the left side, and usually has a metal cover on it. This is the processor controller board. It actually contains a microcomputer, just like your 400/800/1200 personal computer.

### PULL OFF CONNECTORS

There are two 5 wire connectors at the right rear of the side board. The one more towards the front is usually brown, the other purple. Grasp each connector by the connector, not by the wires, and pull to the right, and off the side board. In newer drives the front connector has 2 wires, not 5.

### REMOVE SCREWS

There are three screws holding the side board onto the assembly. Two screws, one at the rear, and one at the front are visible by looking at the board from the left hand side. The third screw is in the middle on the angle bracket, and goes into the bottom metal base. Remove all three screws, and put them in your container.

### BOARD NOW COMES OUT

The side board remains attached by the long connector at the rear which connects the side board to the read board. Using two hands, grasp the side board at the front and the rear, and lift the side board up and out of the connector. Do not use any side to side motion, instead rock the board at the front from front to back, using the added leverage at the front of the board. Be very careful as to not bend the pins in this connector.

Set the whole assembly aside in a safe place where it will not be damaged, proceed to remove the RF shield. Now in front of you, should be the side board and tools only.

## RF SHIELD REMOVAL

Remove the two phillips screws which hold the angle bracket on the side board, place the bracket and screws in your container.

Beneath the ATARI logo toward the front of the side board, on the side opposite to the side where the switch is mounted is a small metal tab. Bend this metal tab so it is perpendicular to the side board. The RF shield may now be removed by opening up the two halves at either side of the board. Put the RF shield into a safe place out of the way.

## TAKE A BREAK!

The work you are about to do on the side board requires patience, and great care. Damage caused by static electricity is most susceptible at the next steps. Damage caused by any lack of responsible handling at this point can be disastrous, resulting in perhaps hundreds of dollars of damage. Give yourself a break, have a soda (no alcohol), and psych yourself into a relaxed but yet attentive mood.

## INTEGRATED CIRCUIT REMOVAL

When removing integrated circuits from their sockets be very carefull as to bend the pins as little as possible. The integrated circuits you are removing have a combined value of well over FIFTY DOLLARS! Remove each integrated circuit described by prying them, a little on each side at a time with your tool inserted between the underside of the integrated circuit and the socket on the sides of the IC 90 degrees from where the pins are located. Place each IC removed pins down on the conductive surface of your container. Sometimes the ICs described below will have a "HOUSE NUMBER" rather than the number indicated, use the pin count and location as a guide to selecting the correct ICs.

Place the side board with the component side up, components facing you. Orient the board so that the switch and red lights are toward the left.

If there is a smaller daughter board mounted on the side board proceed with the daughter board removal section, otherwise skip over it.

## DAUGHTER BOARD REMOVAL

First remove the 40 pin integrated circuit from the daughter board. This is the 1771 disk controller IC.

Lift the board upward as straight as possible while rocking the board slightly from right to left, so as not to bend any pins on the bottom of this board excessively.

Place the daughter board in a safe place. You now have access to the other two ICs to be removed.

## WHICH ICs ARE REMOVED

Capacitors C109, C107 and C102 are along the top left middle of the side board. Directly under C109 is IC A105 which is 1771 disk controller. This may have been removed from the daughter board in the above 'DAUGHTER BOARD REMOVAL' in which case this A105 position is where the daughter board plugged in. This is a 40 pin socket.

Directly under C107 is IC A102 which is the 2316 style read only memory IC, a 24 pin package. If you have an aftermarket EROM in this position be sure to remove any added wires which connect to this package. Any traces cut which go only to this A102 socket position need not be restored. Any traces which have been previously cut which go to any other place on the board will probably have to be restored. Since there are many possibilities, call HAPPY COMPUTING if you are not sure about your non standard board wiring.

Slightly to the right of directly under C102 is IC A101, the 6507 microcomputer IC, a 28 pin package. Remove only the 3 ICs indicated and place them in your container as described above.

## ENHANCEMENT BOARD INSTALLATION

Now remove the HE810S ENHANCEMENT board from its protective shipping material, and straighten any pins on the bottom plugs which may have been bent during shipping. Use extreme care when handling this board. The bottom plug pins are very sensitive to bending and breaking damage, and the components are easily damaged by static electricity.

During the ENHANCEMENT board installation below be very carefull as to not bend the pins on the board, while plugging it into the sockets. As you slowly push the connector plugs into the sockets, look at each pin from the underside of the board to make sure that EACH PIN IS GOING INTO THE SOCKET CUP, AND IS NOT BEING BENT TO THE SIDE. If you push the board on and bend any pin completely over, you will probably ruin the pin and the entire connector. Replacement of a connector on which you have bent the pins is a very expensive job!

If you have the HE810S-X proceed with the section below, otherwise skip the next section.

### HE810S-X INSTALLATION

Remove the seperate 40 pin plug from its protective shipping material, and straighten any pins which may have been bent during shipping. You will notice that the pins on either side of the connector plug are different sizes. Carefully plug the side with the smaller diameter pins into the A105 socket position on the 810 side board, pushing it in all the way. The side with the thicker diameter pins, and the thick metal step should now be facing up out of the plug.

Line up the 28 pin plug on the ENHANCEMENT board with the A101 socket position on the side board, while the 40 pin plug pins stick up through the 40 holes on the ENHANCEMENT board, and carefully press the 28 pin plug all the way into the A101 socket. Once you are sure that the 28 and 40 pin plugs are all the way into the sockets, and everything is lined up correctly, proceed with the soldering below.

Use a fine tip soldering pencil of less than 40 watts and rosin core solder. DO NOT USE A SOLDERING GUN, DO NOT USE ACID CORE SOLDER!

Hold the ENHANCEMENT board so it is as close the parallel to the side board as possible, and solder the four end pins into place. Be carefull as to not touch any other parts with the hot soldering pencil. Once you are satisfied that the board alignment is correct, then soldering all 40 pins into place. Do not use excessive solder, and make sure there are no solder bridges. Skip over the -H and -L installation below.

### HE810S-H and HE810S-L INSTALLATION

To error is only human (TO REALLY FOUL THINGS UP REQUIRES A COMPUTER!). Did you order and receive the correct type of ENHANCEMENT board for your side board? Look at the A105 socket on your side board. If the A105 socket is black you should be installing the -L type. If the A105 socket is blue or reddish brown you should be installing the -H type. The -L type always has a black 40 pin plug mounted a fraction of an inch off the bottom of the ENHANCEMENT board. The -H version may have either a black or a reddish brown plug, and the plug will always be mounted pushed as far as possible into the bottom of the ENHANCEMENT board. Contact HAPPY COMPUTING, or your dealer if you have the wrong type of ENHANCEMENT board.

Align the 40 pin plug with the A105 socket on the side board, while you align the 28 pin plug with the A101 socket on the side board. Be sure that all pins on the plugs are directly over the socket cup holes while you slowly and carefully push the plugs into the sockets. While you are pushing the plugs into the sockets, be sure that no pin is out of the socket and is being bent to the side. Once you are convinced that the board is correctly installed, proceed with IC insertion.

## I N T E G R A T E D   C I R C U I T   I N S E R T I O N

You will be installing the 40 pin 1771 IC and the 28 pin 6507 IC previously removed, into the ENHANCEMENT board which is now mounted on the side board. DO NOT ATTEMPT TO INSERT THESE ICs BEFORE THE ENHANCEMENT BOARD HAS BEEN PLUGGED IN AS ON THE PREVIOUS PAGE, THE PRESSURE MAY RUIN THE PINS ON THE ENHANCEMENT BOARD.

You will not be re-installing the 24 pin ROM IC or the old daughter board.

### P I N   1   O R I E N T A T I O N

Both the 40 and 28 pin IC must be correctly oriented before inserting them into the socket. There is always some identifying mark on the IC body at one end. This mark may be a square or round indentation in the body, or a raised bump.

The 28 and 40 pin IC are both oriented in the same direction. The pin one side of the 28 pin IC points toward the two 14 pin ICs beneath it, and the 40 pin IC pin 1 side points towards the serial number label on your ENHANCEMENT board.

If you plug these ICs in backwards and turn the power on, you will must likely destroy them.

### I N S E R T I N G   T H E   I C s   I N T O   T H E   S O C K E T S

Straighten each pin PERFECTLY on the 40 pin and 28 pin ICs. When installing these ICs, push them in slowly and carefully with the pin 1 oriented as explained above. As you push each IC into the dual socket strips be carefull that each pin is exactly positioned over each hole in the collet socket cup. If any pin is not going in perfectly straight, then remove the IC, straighten the pins, and try again. The pins on the ICs will not tolerate much bending. An IC with a broken pin is totally useless, and will have to be replaced. The combined cost of these ICs is at least twenty five dollars, so work slowly and carefully!

Before proceeding, please be sure that each of these ICs is correctly oriented, with the pin 1 side facing in the direction as explained above, and all pins correctly inserted into the socket cups. It is close to impossible to diagnose any problem with this installation, except to make sure that each component and board is plugged in correctly. Push each IC and the ENHANCEMENT circuit board down firmly into the sockets as far as they will go.

## INITIAL TRY OUT

At this point it is recommended that rather than put the disk drive completely back together first and then try it out, that instead you do a try out with a minimum amount of reassembly.

For this purpose, you will temporarily install the side board back in the assembly, so that you can test that your installation has been successfull. There is no need to install the RF shield or any screws in order to do this.

Proceed with the side board installation below for these initial tests.

## SIDE BOARD PLUG CONNECTION

Line up the pins on the rear board in the 810 assembly with the connector on the rear of the side board such that each pin goes into the connector and gently push the side board onto this connector while making sure that all pins are in the socket and are not being bent out to the side.

Straighten all 5 pins on each of the 2 connectors at the right rear of the side board, and prepare to push the 2 push on connectors into place. The connector which goes toward the front is usually reddish-brown and has a wire sequence from top to bottom of black, green, green, red, black. The push on connector which goes toward the rear is usually purple and has a wire sequence from top to bottom of black, white, red, green, brown. In the newer drives the rear connector will have 5 wires and the front connector will have 2 wires. The two wires on the front connector face down.

Be sure that each of the 5 pins on the 2 connectors is in a socket, that is that the connectors are correctly aligned with the pins, before proceeding.

## TRY IT OUT

Place the disk drive assembly carefully into the bottom case. Remember that right now the side board is only supported by the connector it plugs into so avoid any tension on the side board. Be sure that there are no loose screws in the bottom case or other items which may interfere with the mechanism.

Connect the power to the disk drive and the I/O cable. Make sure that the select switches are set to drive 1. Boot the computer from one of the scratch disks and verify fast and smooth disk reading. Using a PREVIOUSLY UNFORMATTED DISK, format that disk, write DOS files to it, and then verify that this newly formatted disk boots correctly. You have, if all goes well, now realized some of the speed improvement that your HAPPY 810 ENHANCEMENT provides.

Once you have verified that the disk drive seems to be working properly, read the instructions on the DIAGNOSTIC program provided by HAPPY COMPUTING and do a trial run of this diagnostic making sure that all tests "PASS". Let the diagnostic run in the continuous mode to be sure there is no warm up problem.

If you are having trouble making the disk drive work correctly at this point, then see the section "TROUBLE SHOOTING".

## RF SHIELD INSTALLATION

If all went well with the initial try out, then again remove cables for power and I/O from the 810 and move it back to your work area. Remove the bottom cover from the assembly as per "BOTTOM COVER REMOVAL". Remove the side board from the assembly as per "SIDE BOARD REMOVAL". Prepare to install the RF shield.

If there is a small soft plastic bumper inside one of the metal covers remove it. CAREFULL, the edges of the metal cover are very sharp! This bumper was in place originally for the purpose of holding the daughter board in place during shippment. The ENHANCEMENT board which plugs in with two plugs does not need this bumper.

Place the metal cover over the side board and insert the tab you had previously bent through the board, and through the catch on the cover on the other side of the board. Bend the tab down as you originally found it.

Attach the angle bracket to the side board with 2 small phillips head screws. The screws go through the 2 holes in the metal cover on the component side of the circuit board, through the board, through the metal cover on the other side of the board, and screw into the angle bracket. The angle bracket is mounted as it was originally. The small angle portion of the bracket faces down, and away from the circuit board.

## SIDE BOARD INSTALLATION

Plug in and connect the side board as per the instructions "SIDE BOARD PLUG CONNECTION" on the previous page.

Install the screws which hold the side board in place in the same location from which you originally removed them.

## SECOND TRY OUT

It is recommended that at this point you again verify that the disk drive is properly operating. Follow the instructions on the previous page "TRY IT OUT".

## BOTTOM COVER INSTALLATION

If all went okay in the second try out then proceed to install the assembly in the bottom cover. Remove the power and I/O cables from the disk drive before proceeding.

There are 6 small rubber bumpers inside the bottom case, where the screws go through. Five of these bumpers actually have a matching screw hole which is used. The sixth bumper and screw hole in the middle hole is not utilized by ATARI due to the problem of getting the screw in with the RF shield in place. Be sure that all six bumpers are in place.

Line up the plastic face plate with the switch and lights on the side board and insert the front plate into the slots in the bottom case which are at the front, use the two deeper slots which are present. There are also 3 slots along the bottom of the bottom case at the front in addition to the slots which are at the side of the front opening. Do this front face plate alignment while gently lifting and lowering the entire assembly.

Peer down through each of the holes in the bottom plate and line up each of the 5 screw holes with the hole in the bottom cover; a flashlight might help you do this.

Install the screws first just a few turns so that you can easily insert all five screws before tightening. The screw which is at the front left is practically impossible to get to unless you are an ALIEN, so a magnetic screwdriver is desireable. If your magnetic screwdriver is too weak, or not still magnetic, you might try using a little toothpaste or stiff axle grease to hold the screw on the tip of the screwdriver while installing this screw. Be carefull though and do not get any of this foreign substance on any other part in the disk drive.

**DO NOT OVERTIGHTEN THE SCREWS!**, as you will strip the threads; only medium tight is needed.

## TOP COVER INSTALLATION

Position the top cover over the unit and align it with the bottom cover and front panel. Tighten the screws, again do not over tighten. Replace the plastic screw cover tabs over the screw holes and press firmly into place. If these tabs are removed and installed several times, or get dirty, the sticky stuff won't be adequate. A small smidgeon of rubber cement will help in this case.

## FINAL TRYOUT

Reinstall the disk drive cables and verify proper operation of the disk drive. Use the HAPPY BACKUP PROGRAM to make backup copies of both sides of this disk. CONGRATULATIONS!

## NOTES ON ENHANCEMENT REMOVAL

Obviously the steps required to remove the ENHANCEMENT board are about the same as installing it, except for the components on the side board.

When removing the ENHANCEMENT board from the side board use most of the force in the upward direction. Be carefull as to not bend the pins on the ENHANCEMENT board plugs excessively.

Reinstall the 3 original integrated circuits in the following positions and with the stated pin 1 orientation:

2316 IC the 24 pin ROM is installed in socket A102 with pin 1 side TOWARD capacitor C107.

6507 IC the 28 pin microcomputer is installed in socket A101 with pin 1 side AWAY FROM C102, and TOWARD IC Z103.

1771 40 pin package in ATARI daughter board is installed in the only 40 pin socket with pin 1 facing the 14 pin IC nearby and facing C203. The daughter board plugs into A105. Be sure that each pin on the daughter board plugs into the socket.

1771 40 pin package with a non ATARI daughter board... please consult the literature that came with that board.

1771 40 pin package without daughter board is installed in socket A105 with pin 1 AWAY FROM C109 and TOWARD C108. This is the same pin 1 orientation as the 28 pin 6507. The 2316 ROM is installed with pin 1 facing the opposite way as the 1771 and 6507.

## TROUBLE SHOOTING

Problems that can cause the installation to not work correctly include the following with the stated solutons:

1) Improper installation: ICs inserted in the wrong positions or not properly oriented. A102 ROM not removed. Connectors not correctly lined up are not fully inserted. Wires pulled loose from connectors. Bent or broken pins on ICs, connectors, or plugs. Repair or correct as necessary as per the instructions.

2) Disk drive not operating before installation. FORGET IT! Installing the ENHANCEMENT in a nonfunctional disk drive will not produce a functional disk drive.

3) Bad 6507 28 pin IC. It is possible that a bad 6507 might work in an unenhanced 810 but will not work in the ENHANCEMENT board. Try a different 6507. In this case the 6507 was marginally defective to begin with.

4) Defective ENHANCEMENT board. The board was fully tested prior to being shipped from HAPPY COMPUTING. Damage in transit is possible. Return defective boards to HAPPY COMPUTING for free repair during the warranty period. This does not include pins on the ENHANCEMENT board which are broken by you. The pins are thoroughly examined by HAPPY COMPUTING prior to shipment. Before returning the board be sure that something else in the drive is not at fault such as the 6507, and that you can restore the drive to its original working condition without the ENHANCEMENT.